IN THE DRAWINGS:

Attached please find a replacement sheet for Figure 25.

REMARKS

Claims 2-3, 5-11, 17-20, 22-23, 25, and 27-34 remain in the application. Claims 1, 4, 12-16, 21, 24, 26, and 35-37 have been cancelled. Claims 2-3, 5-11, 17-20, 23, 25, and 27-34 have been amended and claims 39-40 are newly added. Applicant respectfully requests reexamination.

Gas discharge panels are commonly used as plasma display panels found in high definition television sets. The present invention improves the luminous efficiency of gas discharge panels by suppressing reactive currents and improves image quality by reducing discharge delays. Conventional panels are relatively inefficient at converting electrical energy into visible light and individual discharge cells often suffer from discharge delays reducing the precision of the displayed image. Innovations that increase energy efficiency and image fidelity are highly desired in the field.

The invention accomplishes these objectives by using a novel waveform for a sustain pulse. Conventional devices use rectangular pulses resulting in large reactive currents that reduce the amount of energy that is converted to visible light. The luminous efficiency and fidelity of these devices can be vastly improved by applying a short pulse of opposite polarity before and after the sustain pulse. This improved waveform is one of the many features of the present invention that make it patentable over the prior art.

Makino (US 6,426,732) discloses a waveform that is different from the Applicant's. *Makino's* waveform consists of a high voltage followed by a low voltage. The disclosure indicates this may increase luminous efficiency. Whether it does or not, the stair-step waveform of *Makino* will do little to reduce discharge delays. In all likelihood it will increase them since the high voltage spike preceding the sustain pulse is of the same polarity. This would result in a decrease of free electrons available increasing the response time. In addition, the *Makino* waveform as shown in Fig 8 does not have the single sharp edge that provides a crisp response. The *Makino* waveform inherently results in a fidelity/luminous efficiency tradeoff. *Makino* waveform users are likely to experience some blurring due to discharge latency.

Mikoshiba et al (US 6,456,265) also fails to recognize the importance of a sharp opposite polarity pulse before the sustain pulse. The *Mikoshiba* pulse is applied 40 or 100 nS after the pulse. Thus a *Mikoshiba* device does not benefit from the response properties of a sharp short duration pulse immediately before the sustain pulse or a sharp short duration pulse immediately after the pulse.

Moreover the idea of combining *Makino* and *Mikoshiba* waveforms seems unlikely even for those skilled in the art. It is the exception rather than the rule that a control waveform that produces a first result and a control waveform that produces a second result can be combined to provide a waveform that produces both results. Thus, even if the *Makino* and *Mikoshiba* waveforms provide independent and unique features it is doubtful that combining the waveforms would result in a realization of each of the features.

Specification:

The Office Action objected to the passage "In the discharge sustain period, sustain pulses are applied across the scan electrodes 19a and the sustain electrodes 19b with **alternating** polarity" (Office Action, Paragraph 5). The Office Action asserts that Figure 4 shows the discharge sustain pulses applied to scan electrodes 19a and sustain electrodes 19b with the same positive polarity. Applicant believes that the Office Action has misinterpreted the text of this passage and Applicant has made a clarifying amendment to the passage. Applicant respectfully traverses the objection.

All of the sustain pulses of Figure 4 show alternate polarity pulses. This is explained in detail in the description of the first and second embodiments, (application, page 27, lines 11-12 page 35 line 20 – page 36, line 1). It should also be apparent from the drawing that there are pulses of alternating polarity. Looking at 19b1 – 19bN of Figure 4 at the beginning of the discharge sustain period is at a quiescent voltage. The voltage then drops for a short duration immediately followed by a voltage rise (above the quiescent voltage) followed by a return to the quiescent voltage. This polarity alternating waveform repeats throughout the discharge sustain period.

Pulses 19a1 – 19aN show similar waveform patterns shifted in time. Immediately prior to the discharge sustain period the voltage drops for a short duration immediately followed by a voltage rise (above the quiescent voltage) followed by a return to the quiescent voltage. This polarity alternating waveform also repeats throughout the discharge sustain period.

In light of this explanation and the clarifying amendment, Applicant respectfully requests that this objection be withdrawn.

Drawings:

Figure 25 has been amended with the legend "Prior Art." Accordingly, Applicant requests that this objection be withdrawn.

The Office Action also objected to the drawings under 37 CFR 1.83(a), (Office Action, Paragraph 6).

The Office Action asserts the drawings do not show "a driving circuit successively applies a plurality of sustain pulses which alternate in polarity, to each of the plurality of discharge cells" as recited in Claims 1, 2, 7, 17, 18, 19, 23, 25 (Office Action, Paragraph 7). Claim 1 has been cancelled. Figure 5 shows a driving circuit 105 with a sustain pulse generator 112b that generates sustain pulses for the sustain electrodes 19b that form the horizontal portion of each of the discharge cells. The recitation "applying a plurality of sustain pulses which alternate in polarity" has been removed from the claim language.

The Office Action asserts the drawings do not show "a driving circuit successively applies a plurality of sustain pulses which alternate in polarity, between each pair of a first and second electrode" as recited in Claims 12, 14, 27, and 29 (Office Action, Paragraph 7). Claims 12 and 14 have been cancelled. Figure 5 shows a driving circuit 105 with a sustain pulse generator 112b that generates sustain pulses for the sustain electrodes 19b that forms the horizontal portion of each of the discharge cells. The recitation "applying a plurality of sustain pulses which alternate in polarity" has been removed from the claims.

The Office Action also asserts the drawings do not show "a discharge sustaining step for successively applying a plurality of sustain pulses which alternate in polarity between each pair of first and second electrodes" as recited in claims 31-34. Figure 4 and Figure 16 show a plurality of sustain pulses between each pair of electrodes. The recitation "applying a plurality of sustain pulses which alternate in polarity" has been removed from the claims.

For the reasons stated above, Applicant respectfully requests that this objection be withdrawn.

Claim Objections

Claim 35 was objected to for informalities. Claim 35 has been cancelled.

Claim Rejections – 35 USC § 112

Claims 35-38 were rejected under 35 U.S.C. 112 second paragraph. Claims 35-38 have been cancelled. Applicant requests that this rejection be withdrawn.

Claims 1-3, 5-14, 17-20, 22, 23, 25, and 27-38 were rejected under 35 U.S.C. 112 first paragraph.

In rejecting Claims 1-3, 5-14, 17-20, 22, 23, 25, and 27-34, the Office Action again asserts that the sustain pulses do not alternate in polarity but all have the same positive polarity as shown in any of Figs 4, 15, 16, and 22-24. As explained in the specification above, Applicant believes that the Figures show an alternate polarity. Looking specifically at Figure 22, the voltage waveform of electrode 19b goes from a quiescent voltage to $-V_2$ to V_3 to a quiescent voltage to V_3. The accompanying text describes what is apparent from the drawing that is that-V_2 is a negative voltage, (application, page 43, line 13). Nevertheless, Applicant has modified the claims removing reference to "applying a plurality of sustain pulses which alternate in polarity" to make the specification even more enabling.

Claims 35-38 have been cancelled.

For the reasons stated above, Applicant requests that this rejection be withdrawn.

Claim Rejections – 35 USC § 102

Claims 7, 8, 11 and 32 were rejected under 35 USC § 102 (e) as being anticipated by *Makino*. The claims have been amended to further distinguish over *Makino* and the prior art of record.

Claim 7 and 32 recites "wherein immediately before a leading edge of at least a sustain pulse of the plurality of sustain pulses which is first applied, the driving circuit applies a voltage to at least one of the first electrode and the second electrode so that a short pulse, which is opposite in polarity to a potential generate between the first electrode and the second electrode by the sustain pulse, is formed between the first electrode and the second electrode, for a predetermined period that is no more than 100 ns." This reciprocating potential difference makes the Applicant's invention more luminously efficient and more resistant to discharge latency creating a sharper display image with less power. This limitation is neither disclosed nor suggested in *Makino* making claim 7 and 32 patentable.

One of the advantages of limiting the period to 100 nS or smaller is that a larger voltage can be used without causing dielectric breakdown in the discharge cell. The Applicant's period is less than half the *Makino* suggested 200 nS period, (*Makino*, column 6, line 37). Thus the *Makino* device could only sustain a pulse of half the voltage without dielectric breakdown. A robust high voltage short pulse prevents discharge delays producing a sharper more precise image.

A larger pulse length also means less free electrons since the electron can travel the distance of the cell. This means less luminous energy is converted to visible light. Thus a *Makino* like device would have less luminous efficiency and less fidelity.

Claims 8 and 11 recite "an absolute value of a voltage of the short pulse formed by the driving circuit is no smaller than an absolute value of a voltage of the sustain pulse." The large voltage spike preceding the sustain pulse of this feature improves discharge response time and luminous efficiency. This limitation is neither disclosed nor suggested in Makino making Claims 8 and 11 patentable also.

For the reason stated above, applicant respectfully requests that this rejection be withdrawn.

Claim Rejections – 35 USC § 103

Claims 1-3, 5, 6, 9, 10, 12-14, 17-20, 22, 23, 25, 27-31, and 31-38 were rejected under 35 USC §103 (a) as being anticipated by *Makino* in view of Mikoshiba. The claims have been amended to further distinguish over *Makino* and the prior art of record.

Claims 1, 12-14, and 35-38 have been cancelled.

Claims 9-10 depend from claim 7 and are patentable for the same reasons. *Mikoshiba* also does not disclose the recited limitation, "wherein immediately before a leading edge of at least a sustain pulse of the plurality of sustain pulses which is first applied, the driving circuit applies a voltage to at least one of the first electrode and the second electrode so that a short pulse, which is opposite in polarity to a potential generate between the first electrode and the second electrode by the sustain pulse, is formed between the first electrode and the second electrode, for a predetermined period that is no more than 100 ns." The Office Action asserts that *Mikoshiba* discloses a pulse applied immediately *before* a leading edge of each sustains pulse (Office Action, Page 10, Lines 1-5). However, the cited text says that the sustain pulse is applied 40 nS *after* the application of the discharge sustaining pulses. Since the recited feature is neither disclosed nor suggested in *Mikoshiba* or *Makino*, Claims 9 and 10 are patentable over any combination.

Independent Claim 2 and dependent Claims 3, 5, and 6 recite "wherein immediately before a leading edge of each sustain pulse the driving circuit applies a voltage to at least one of the first electrode and the second electrode so that a short pulse, which is opposite in polarity" has been added to the claim language to further distinguish over prior art. Neither *Mikoshiba* nor *Makino* disclose this limitation making the claims patentable over any combination. Enabling disclosure of this feature can be found in Figure 15 and associated description, (application, page 36, line 16 – page 38, line 3).

Claims 12-14 have been cancelled.

Claim 31 recites "wherein the discharge sustaining step, immediately before a leading edge of each sustain pulse, a voltage is applied to at least one of the first electrode and the second electrode so that a short pulse, which is opposite in polarity ...". The claim language has been added to further distinguish over the prior art. Enabling disclosure of this feature can be found in Figure 15 and the associated description, (application, page 36 line 16 – page 38 line 3).

In rejecting Claims 23, 25, 29, 30 and 34 the Office Action acknowledges that *Makino* does not disclose a short pulse of less than 100 nS. The Office Action asserts that *Mikoshiba* discloses a related discharge display apparatus wherein the short pulse is applied immediately after a trailing edge of each sustain pulse. The cited disclosure however teaches away from applying the pulse immediately after a trailing edge by asserting it should be applies 40 nS or 100 nS after the pulse. Applicant does not understand why *Mikoshiba* would teach delay of the pulse if it would be obvious to someone skilled in the art that superior results could be obtained by not delaying the pulse.

In rejecting Claims 17-20, 22, 27, 28 and 33 the Office Action uses similar reasoning in its combination of *Makino* and *Mikoshiba*. Applicant submits that it is only with the benefit of improper hindsight that the Office Action can attempt to combine these two reference and further assert that it would not be obvious to someone skilled in the art to modify a pulse, contrary to the teaching of *Mikoshiba* (applying the pulse immediately rather than after a 40 ns or 100 ns delay) to arrive at the Applicant's claimed invention.

For the reasons state above the applicant respectfully requests that this rejection be withdrawn.

Claims 39-40 have been added. Enabling disclosure can be found in Figure 15 and the descriptions of the first and second embodiments, (application page 27-29 and page 35-38).

With the above remarks, it is believed that the original, amended and new claims are patentable over the cited references and the prior art of record and an early notification of allowance is requested.

If the Examiner believes a telephone interview will help further the prosecution of this case, the undersigned attorney can be contacted at the listed phone number.

I hereby certify that this correspondence is being deposited with the United States Postal Service as First Class Mail in an envelope addressed to Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450 on February 1, 2006.

By: Sharon Farnus

Sharon Farnus

Signature

Dated: February 1, 2006

Very truly yours,

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